CLAIMS

Sub A3

1. An in-situ pile apparatus comprising:

a) a lowermost helical anchor;

b) a plurality of hollowed pile sections that are connectable end to end, a lowermost of the pile sections being connectable to the helical anchor;

c) an internal drive system that is comprised of a plurality of sections that are connectable end to end and which fit inside of the hollowed pile sections, the drive including enlarged members that fit at the joints between respective pile sections.

2. The apparatus of claim 1 wherein the enlarged diameter section is square in transverse cross section.

N.A.

3. The apparatus of claim 2 wherein the pile sections have squared end portions that are shaped to fit the squared end portion of another pile section.

4. The apparatus of claim 1 wherein each of the pile sections carries circumferentially spaced radially extending soil displacement ribs.

5. The apparatus of claim 1 wherein the internal drive is hollow and further comprising a rod that extends longitudinally through the hollow interior of the internal drive.

6. A method of installing a piling system comprising the steps of:

a) thrusting a helical anchor into the earth;

b) connecting one or more pile sections to the helical anchor, each of the pile sections having squared end portions that are connectable with respective other squared end portions

N.A.

of other pile sections;

c) driving the anchor and pile sections with an internal drive that includes a plurality of longitudinally extending end to end connected drive members, and wherein the internal drive includes enlarged drive members that are placed at spaced apart positions and which fit the joint between pile sections, registering at (the squared end portions (of connected pipe sections.))

7. The method of claim 6 wherein each of the pile sections is shaped to connect to another pile section at a joint with a combined configuration that transmits torque and further comprising generating torque with the internal drive and transferring torque to the pile sections via the joints.

8. The method of claim 6 wherein in step "b" each pile section has at least one squared end portion, and the squared end portions are joined together.

9. The method of claim 6 further comprising the step of filling the bore of a pile section with a filler material.

10. A method of installing a piling system comprising the steps of:

a) thrusting an anchor into the earth;

b) connecting a first pile section to the helical anchor, the pile section having a bore and an upper and lower end portions, each having a connector;

c) connecting a second pile section to the upper end portion of the first pile section, the second pile section having a bore, the first and second pile sections having a drive joint at a connection that joins them;

d) driving the anchor and the first and second pile

sections with an internal drive that includes a plurality of longitudinally extending, connected drive members, and wherein the internal drive includes enlarged drive members that are placed at spaced apart positions and which each fit a drive joint between two connected pile sections, registering at the connected end portions of two connected pile sections.

11. The method of claim 10 wherein in step "a" the anchor is a helical anchor.

12. The method of claim 10 further comprising the step of filling the bore of a pile section with a filler material.

13. The method of claim 10 further comprising the step of filling the bore of a pile section with a grout filler material.

14. The method of claim 12 further comprising the step of removing all or part of the drive member before adding the filler material.

15. The method of claim 13 further comprising the step of removing all or part of the drive member before adding the grout material.

16. An in-situ pile apparatus comprising:

a) a lowermost helical anchor that is configured to be driven into a soil mass;

b) a plurality of hollowed pile sections that are connectable at joints that have open bores, a lowermost of the hollowed pile sections being connectable to the top of the anchor;

c) an internal drive system that is comprised of a plurality of sections that are connectable and which fit inside

of the hollowed pile sections, the drive system including enlarged sections that snugly fit the open bore of the joints between respective pile sections.

17. The apparatus of claim 16 wherein the enlarged diameter section is a solid structure that occupies a joint open bore during use.

18. The apparatus of claim 17 wherein the pile sections have end portions that are shaped to fit the end portion of another pile section in telescoping fashion.

19. The apparatus of claim 16 wherein each of the pile sections carries a plurality of circumferentially spaced radially extending soil displacement ribs.

20. The apparatus of claim 1 wherein the internal drive system includes a rod that extends longitudinally through each pile section and enlarged drive members placed at intervals along the rod, the enlarged drive members occupying the joint bores during use.

21. A multi-section pile apparatus, comprising:

a) a lowermost anchor that is configured to be driven into a soil mass by rotation, the anchor having a helically threaded portion;

b) a plurality of pile sections that are connectable end-to-end at joints, the pipe sections and joints having hollow bores, a lowermost of the pile sections being connectable to the top of the anchor;

c) an internal drive that fits inside of the pile sections, the drive including enlarged sections that snugly fit the bores of the joints between respective pile sections, each

joint being occupied by an enlarged section of the drive; and

d) wherein the enlarged section and the joints are configured with non-annular surfaces that enable torque to be transmitted from the drive to the pile sections.

22. The apparatus of claim 21 wherein the enlarged diameter section is a solid structure that occupies a joint open bore during use.

23. The apparatus of claim 22 wherein the pile sections have end portions that are shaped to fit the end portion of another pile section in telescoping fashion.

24. The apparatus of claim 23 wherein each of the pile sections carries a plurality of circumferentially spaced radially extending soil displacement ribs.

25. The apparatus of claim 21 wherein the internal drive system includes a rod that extends longitudinally through each pile section and enlarged drive members placed at intervals along the rod, the enlarged drive members occupying the joint bores during use.

26. A multi-section pile apparatus, comprising:

a) a lowermost anchor that is configured to be driven into a soil mass by rotation, the anchor having a helically threaded portion;

b) a plurality of pile sections that are connectable end-to-end at joints, the pipe sections and joints having hollow bores, a lowermost of the pile sections being connectable to the top of the anchor;

c) an internal drive that fits inside of the pile sections, the drive including enlarged sections that snugly fit

the bores of the joints between respective pile sections, each joint being occupied by an enlarged section of the drive;

d) wherein the enlarged section and the joints are configured with non-annular surfaces that enable torque to be transmitted from the drive to the pile sections; and

e) the lower end portion of the drive having a connector that enables a connection to be made between the lower end portion of the drive and an upper end portion of the anchor.

27. The apparatus of claim 26 wherein the enlarged diameter section is a solid structure that occupies a joint open bore during use.

28. The apparatus of claim 27 wherein the pile sections have end portions that are shaped to fit the end portion of another pile section in telescoping fashion.

29. The apparatus of claim 26 wherein each of the pile sections carries a plurality of circumferentially spaced radially extending soil displacement ribs.

30. The apparatus of claim 26 wherein the internal drive system includes a rod that extends longitudinally through each pile section and enlarged drive members placed at intervals along the rod, the enlarged drive members occupying the joint bores during use.

31. A multi-section pile apparatus, comprising:

a) a lowermost anchor that is configured to be driven into a soil mass by rotation, the anchor having a helically threaded portion;

b) a plurality of pile sections that are connectable end-to-end at joints, the pipe sections and joints having hollow

bores, a lowermost of the pile sections being connectable to the top of the anchor;

c) an internal drive that fits inside of the pile sections, the drive including enlarged sections that snugly fit the bores of the joints between respective pile sections, each joint being occupied by an enlarged section of the drive;

d) wherein the enlarged section and the joints are configured with non-annular surfaces that enable torque to be transmitted from the drive to the pile sections;

e) the lower end portion of the drive having a connector that enables a connection to be made between the lower end portion of the drive and an upper end portion of the anchor; and

f) the combination of pile sections and joints being continuously hollow so that fill material added to the uppermost pile section enables all of the pile sections to be filled with fill material.

32. The method of claim 31 further comprising (water barrier pipe means) that span between a soil line and a water surface during use, mounted on the upper end of the assembled pile sections.

N.A.